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VOGEL'S THEORY OF *NOVA AURIGÆ.*

[Translated by Mrs. ELIZABETH B. CAMPBELL from *Über den neuen Stern im Fuhrmann*, Royal Academy of Sciences, Berlin.]

"The view that the *Nova* is to be explained by the encounter of one heavenly body with several bodies urged itself upon me after the first observations, and this idea has, in the course of time, been continually strengthened by further observations. Here the question whether the probability for a meeting of such a nature among heavenly bodies is not too slight a one, gives rise to doubts, to be sure. Yet these doubts seem wholly removed by the consideration that, according to the KANT-LAPLACE theory of the origin of our solar system, a greater body can indeed scarcely be thought of without companions ; and it seems altogether surprising that among all the hypotheses of new stars this proposition, without being investigated further, has been allowed to go unheeded. If one supposes that a body, whose mass is of the order of our Sun's mass, should suddenly come close to a solar system similar to ours, whose central star, through gradual cooling off, had lost its light, a tremendous disturbance would be caused thereby, and collisions with single members of the system, and appearances of light consequent thereon, would be inevitable.

"The body which in the composite spectrum of the *Nova* has shown the continuous spectrum with absorption bands, and which, as known, travels through space with a velocity of about 400 miles (per second), might have come close to a system whose motion did not deviate from ordinary proportions, for whose direction of motion no special supposition would need to be made.

"By passing close to a greater or several smaller bodies of the system, perhaps also by direct collision with smaller bodies, the star entering the system is suddenly transformed into a state of intense heat. At the time of the spectroscopic observations, the body found itself in a part of the supposed solar system which was filled up the more thickly with diminutive bodies. These, on account of the near approach and partial collisions, have, next in order, assumed the state of intense heat which the surface and atmosphere of the penetrating body must have had, as shown by the continuous spectrum with absorption lines, displaced far toward the violet. They have in this way received a very great degree of heat and a greater or less velocity, to which the spectrum with bright lines owes its origin. They have thus produced an effect similar to the particles of cosmic cloud in SEELIGER'S theory, except that this essential difference exists, that the motion of the little bodies is regulated by the central body, so that while they keep up a continual stream toward the penetrating body, they cannot move upon it from all directions.

"With this explanation, it becomes clear why the bright lines were broadened, pushed to one side, and faded. Also, there is no longer anything strange in the fact that the bright lines, which showed the least displacement (the violet edges of the bands) did not coincide with the center of the dark lines, but bespoke a slight motion in space which possibly was not very different from that of the supposed solar system.

"By reason of the unavoidable tidal disturbances and the eruptions consequent thereon, increase of heat in the atmosphere of the central body and the larger bodies of the system followed, which, even if not so intense that the surface of the body presented a higher temperature than its atmosphere, would in any case have given a spectrum with special bright lines, whatever was next to be expected from the outside heating of the smaller bodies by falling upon the penetrating body. Thus, is a simple way, does the intensity-maximum of the bright hydrogen lines explain itself, which signifies a slight movement in space, and which in the beginning possessed the greatest intensity.

"Moreover, for the second intensity-maximum which maintained itself a long time, and for the third maximum of only passing occurrence in the bright hydrogen lines, yes, even for the fine bright lines which occur in the dark hydrogen lines, explanations can be found (under the supposition that these last are not to be considered as reversed appearances, under which, by the way, they can be explained by none of the before mentioned hypotheses) in the foundation of the suppositions, for whose probability in so disturbed a system sufficient points of support have been given.

"More particularly I would adduce, that the irregularities which were observed in the measures of the D lines, inasmuch as the displacement of the middle of the line in the star spectrum from its normal position was found to be less than in the hydrogen lines (HUGGINS, BECKER), as well as similar observations of the finer chromosphere lines (CAMPBELL), are here given explanation, since in the spectrum resulting from different bodies the same lines would not need to enter in. Further, I call attention to the fact that the second illumination of the *Nova* in the autumn of 1892 can be attributed to a meeting of the body hastening through the supposed solar system with a single outside member of the same; and I notice still further, that indeed the surest proof of the correctness of the views here expounded would be given, if the changes of the wave-lengths of the bright lines in the spectrum now visible would allow themselves to be proven with greater certainty as CAMPBELL'S observations indicate them, which would allow us to assume an orbital motion.

"However, I will no longer lose myself in details, since it was my purpose in the main, only to show: that the probability for the meeting of a body traveling about in space with an orderly system of bodies is none too slight, since against the supposition of a planetary system among the fixed stars there is nothing to be urged; and that through the supposition of such a system, in which a body which moves with the abnormal velocity of 400 to 450 miles could have remained for weeks, yes, months (since, for example, it would need fully five months to traverse our solar system) the most important of the observed appearances of the *Nova* can find a natural explanation."

THE NEW STAR IN *NORMA*.

Brief reference was made in the November number of these *Publications*, page 225, to the discovery of a new star in the southern sky. In response to Professor PICKERING'S telegram to the observatories, announcing the discovery, Professor KAPTEYN suggested that the star was almost without doubt identical with a 9.2 magnitude star shown on five Cape of Good Hope plates, exposed in the years 1887-1890. Fortunately Professor PICKERING was able to remove all doubt on this point; and in case the star remains bright a few months we shall probably obtain considerable information which will be exceedingly valuable in the study of new stars. Professor PICKERING points out the fact that the main features of this star's spectrum are identical with those of *Nova Aurigæ's* February, 1892 spectrum. If now the bright lines in *Nova Normæ's* spectrum should be found to be multiple, as was the case in *Nova Aurigæ's* spectrum, we could safely attribute an identical origin to the two stars. Further, many of the *special* theories propounded by various